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Does support from government help firms survive? Evidence on financial and political assistance in China, 1998-2007

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Abstract:

Using the NBS dataset over the period 1998-2007, this paper examines the dual roles of financial assistance and strong political links on firm survival in China by applying a semi-parametric duration model. We find that generally either financial assistance or strong political links had a positive effect on the likelihood of firm survival. Furthermore, if firms received both types of support from government, their survival rate was around 2 times as high compared to only receiving a single support. The likelihood of survival depended on the amount of assistance a firm received. We also find firm ownership impacts on its survival pattern. Lastly, China joining the WTO coincided with (cet. par.) higher firm failure, especially with regard to state-owned firms; however, this period also saw the authorities targeting political and financial help on the 'better' firms (especially SOE's) with characteristics likely to increase their chance of survival.

Keywords: Financial assistance; political links; firm survival; China

JEL codes: D24; O14; O43

1. Introduction

China is perceived as a country that provides large-scale assistance to industry (Haley and Haley, 2013). By financial assistance, we also include tax holidays as well as subsidies (see Aghion et. al., 2015; Harris and Li, 2016). But what is the effect of government assistance on the likelihood of firm failure? A recent paper by He and Yang (2016) investigated the determinants of firm failure in China and stressed the role of government support. Using subsidies, loans from banks and whether located in a key industry, as proxies for government support, the results showed that supportive policies can help firms survive and also mitigate the impact of competition effects on older firms. Howell et. al. (2016) also investigated the mediating effects of government assistance on new firm failure, finding that subsidies positively helped firms to survive, although agglomerated firms with more subsidies tend to exit.

However, none of the studies to date have considered the associated role of political affiliation (i.e., links with central, provincial or local government), which in China can be considered as another form of government assistance. (Faccio, 2006; Li et.al.,2006; Tan et. al., 2007). Liet. al. (2005) linked political behaviour to firm survival for state-owned firms; they classified such SOEs into those related to central government vis-a-vis local government and found that central SOEs had a higher probability of staying in the market. But their study is limited to one Chinese Science Park in Beijing during the period 1995-2002. Furthermore, Du and Girma (2010) considered new private sector firms in manufacturing, using data from the Annual Report of Industrial Enterprises Statistics of China between 1999 and 2005. They classified the firm's political links into three categories: high government affiliation, middle government affiliation and local government affiliation. They presented evidence to show that new private firms seek political affiliation with government to lower their exit risk by reducing future uncertainty.

Based on the above literature, political affiliation and direct government assistance have both been shown to help firms survive, but is too much assistance from both political connections and financial help a good thing? In this paper, we investigate the impact of both on firm survival, for all types of firms – not just SOEs, or new firms or those limited to the private sector. We do this by introducing government financial assistance, political affiliation, and interactions between the two, as well as other covariates (e.g., state ownership and private ownership), into a Cox proportional hazard model. As a robustness check, we also apply parametric models using a Weibull distribution, a Complementary log-log model as well as an Accelerated Failure

Time model. The coefficients from these various models confirm the robustness of our preferred approach using the Cox approach that firms receiving assistance, no matter the level of assistance, will generally face a much lower hazard rate of failure than non-assisted firms. Moreover, firms with political links to central or provincial governments who also received financial assistance had a survival probability that was (cet. par.) up to twice as strong as the effect of only having strong political links. Overall our results also show that there was a major change after China joined the WTO in 2001, with the authorities targeting joint financial and political help more specifically on firms more likely to survive, especially the 'better' SOEs, but private-sector firms with strong political links had a significantly higher risk of failure.

Apart from the literature mentioned above, we are only aware of three other papers which have considered either assistance or political ties as the determinants of Chinese firm failure. Zheng, et. al. (2015) used data for TV manufacturing between 1993 and 2003, confirming that political ties can lower exit risk. Focusing on a limited sample of Hong Kong firms covering March to September 2008, a working paper by Sharif and Huang (2012) found that government financial support for firms' innovation activities from government had no impact on survival. Other literature studying the case of government assistance or political links in other developing and developed countries is rare and the results are inconsistent. Hansen et.al.(2009) investigated both the direct and moderating effects of direct government assistance on small-and-medium sized manufacturing enterprises in Vietnam, and found that direct government support had no impact on firm failure, while firms with governments as their main customer showed a higher survival rate.

The remainder of this paper is structured as follows. In the next section, we review previous research and put forward the hypotheses/rationale for government assistance affecting business failure in China. In section 3, the data, measurement issues, methodology and results are presented. The final section concludes.

2. Rationale of government support

China began the transition from a planned economy to a market economy in the early 1990s (Brandt and Rawski, 2008). At the same time, the opening-up of markets was aided by a process of decentralization, whereby local and provincial governments have been granted greater autonomy in industrial policy. Thus, market competition emerged at local and regional level, and these competition effects have been amplified by China entering the WTO at the end of

2001. Domestic firms lacked the organizational and technical capabilities to compete with fully-developed overseas competitors, with such capabilities needing to be learned from learning-by-doing (Khan, 2015). Chinese policymakers concluded from the successful experience of Korea and Japan, there was a need to support 'strategic industries' (Harris and Li, 2016). Therefore, Chinese policymakers made available large subsidies and tax incentives to finance learning-by-doing in firms, to help them survive as competition significantly increased. At first only SOEs could receive assistance with their managers lobbying for subsidies and tax holidays from government officials; thus SOEs enjoyed preferential status for obtaining bank loans (Che, 2002), for entering into new markets and often becoming monopolies in such markets. However, since the late 1990's, after privately-owned firms were legitimized and formal private ownership were endorsed as 'an important part of the socialist market economy' by central government (Sun et.al., 2010), financial assistance has also been given to the private sector .

In addition to financial assistance, the government also controls and provides assistance to certain enterprises through a *lishu* relationship, which means a firm is "subordinate to" or "directly controlled by" government.[1] This involves "… approvals for licences, domain, major projects, major operations decisions (such as profit distribution and investment) and firm structures" (Tan et. al., 2007, p. 788), all of which are set to meet political objectives. As well as controls, the *lishu* relationship also involves government support and subsidies (e.g., access to finance, more favourable tax treatment, as well as the granting of contracts, access to raw materials and other 'scarce resources'[2], etc.). For privately owned firms, political links are typically established once government own some of the shares of the firm, or through accepting government input (Du, 2016). The latter includes but is not limited to capital, land, loans, and approvals for licenses. The level of government to which a firm is subordinate usually depends on its ownership structure, location, scale as well as industry and strategic importance (Li, 2004). Generally, SOEs or firms located in an industry of strategic importance tend to affiliate with higher levels of governments, while private firms are more likely to affiliate with lower levels of governments.

[1] The Chinese name for this relationship, as represented in the National Bureau of Statistics database we use below, is 隶属关系.

[2] Closer ties to government can also help businesses to overcome market and state failures in securing property rights and enforcing contracts – Li et. al., (2008) and Zhou (2013). Note, therefore, this definition of politically connected firms is different to the approach adopted by Faccio (2006), who looked at such connections across 47 countries (excluding China).

Different levels of government often have different policy objectives; for example, central government controls more monopolized resources and thus grants firms under their control more privileges (Tan et al., 2007) with Haley and Haley (2013) concluding that provincial governments generally deploy massive subsidies to their favoured enterprises for provincial objectives rather than those set by central authorities. SOEs affiliated with higher level of government generally are expected to meet certain 'social' goals set by politicians, such as employment targets, but it can still be relevant to privately-owned and foreign-owned firms (either because of the strength of political connections and/or because of intervention by government).[3] In this paper (see next section), we categorized all firms into three groups by their *lishu* relationship; firms affiliated with central or provincial governments are categorised as having strong political links, those affiliated with local governments[4] as having medium political links[5], and lastly firms with no political links.

Although political links with government means an additional layer of support, often the firm's own interests may be constrained. For example, in privately-owned firms affiliated with higher level of government, central/provincial governments usually retain the right to appoint CEOs as well as make the ultimate decisions regarding any potential merger or acquisition (Fan et. al., 2007). And as stated in Sun et. al. (2010), if local government directly financed the firm at start-up they often became deeply involved in the operational decision-making process. Such relationships between business and government may harm competitiveness due to the probability of rent seeking (Porter, 1990); for example, compared with non-politically connected firms, evidence has been presented that shows if firms' CEOs are politically connected, they will be more likely to employ current or former government bureaucrats rather than professional directors (Fan et.al., 2007), which can have a negative impact on firm operation decisions and increase the risk of firm failure. However, whether financial assistance or political assistance – and their combination – impacts on firm failure is an empirical issue, to which we now turn, noting Ding et. al. (2016) who show that in the manufacturing sector only 16% of firms had no political affiliation with governments in 1998, while in 2007 this figure had grown to 76%.

[3] An essential difference in the *lishu* relationship between publicly-controlled and privately-owned firms tends to be that the former are more beset with meeting policy goals (e.g., employment) rather than receiving favourable treatment such as subsidies and/or access to finance (Wu et. al., 2012, Guariglia and Mateut, 2016).
[4] Including prefecture-, district-, city-, county-, township- as well as village-level governments
[5] Note that in our empirical work (section 3 below) firms with medium political links are the benchmark sub-group.

3. Data and empirical methodology

3.1 Data

Our data are obtained from the annual accounting reports filed by industrial firms with the National Bureau of Statistics (NBS) over the period of 1998-2007. The dataset includes medium and large-sized firms with sales above five million yuan (about US$743,200) as well as extensive information on the firm's establishment year, employment, political affiliation (i.e., 'lishu'), and whether a firm received a tax holiday and/or subsidies (Harris and Li, 2016, provide more details on the extent of financial subsidies). The database covers more than 550 thousand firms, corresponding to 2.18 million firm-year observations.

In order to investigate the factors influencing firm survival, it is necessary to define the duration of the life of a firm. Based on information on when the firm opened, we include all firms that opened since 1978 (which is the beginning of the transition from a planned to a market economy in China), unlike other papers using the same dataset which mainly focused on firms opening since 1998 or 1999. Using the NBS dataset, there are three situations where a firm can exit from the dataset: (1) a decision to stop operations due to financial problems or government policy; (2) a merger or acquisition by other firms;[6] (3) sales drop permanently below the threshold of 5 million yuan (Audretsch et. al., 2016). Whilst we can mitigate against (2) – see footnote 2 – we do not know if (3) leads ultimately to firm closure. Thus, we follow He and Yang (2016), and measure 'firm failure' instead of 'firm death', where a firm's failure in year *t* is based on it being observed in the dataset up to *t* but not in subsequent periods; thus firms falling below 5 million yuan are counted as having failed. We identify 1.8 million firms[7] who entered the market on and after the year of 1978 and are present for at least some or all of 1998-2007.

The definition of the variables used here are presented in Table 1[8]. Figure 1 presents the percentage of firm that failed for certain different subgroups. Specifically, firms that received assistance had on average a lower failure rate around 9.8% compared to the average of 12.0% for those that received no assistance. The average failure rate for firms with strong political

[6] We generally observe 'exit' when the firm's unique company code disappears from the dataset. But, for some firms, merger or acquisition results in the creation of a new company code, not the adoption of the code of the acquiring firm. Using company name, address and zip code, we have re-established the pre-existing code to mergers and acquisitions where a new code had been wrongly created.

[7] We think it is important not to, a priori, drop what may seem to be outliers without direct evidence.

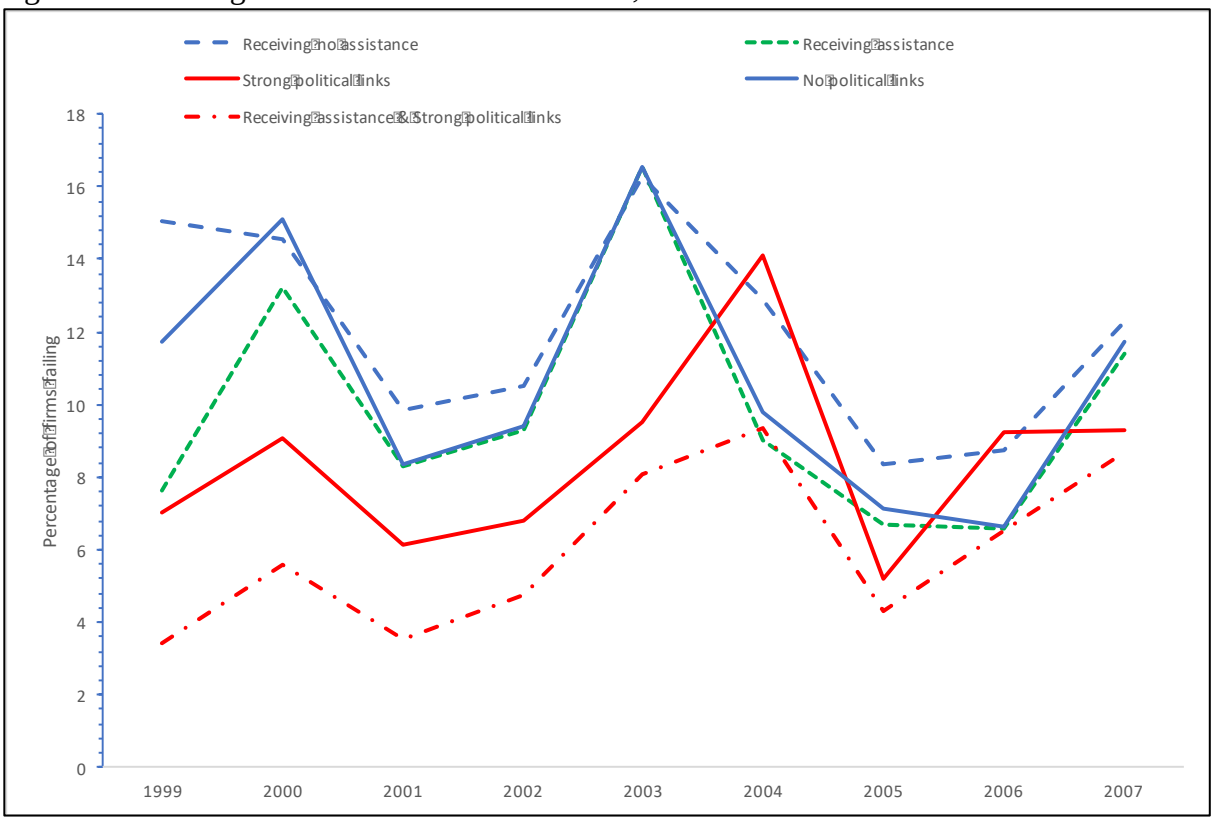
[8] TFP was taken from Harris and Li (2016),which uses the same methodology as that used in Ding et. al. (2016).

links was 8.5%, which was lower than firms receiving assistance. Overall, firms receiving both financial assistance and with strong political links enjoyed the lowest failure risk.

3.2 Empirical specification

Previous studies of China have applied different models to investigate the determinants of firm survival (e.g. Pan and Chi, 1999; Li, Zhang and Zhou, 2005; Lu and Xu, 2006; Batjargal, 2007; Lin and Huang, 2008; Naidoo, 2010; Murray et.al., 2012). He and Yang (2016) applied a linear probability model to test if government subsidies affect firm survival. Sharif and Huang (2012) applied a probit model to investigate the role of public financial support on HK-owned firms in Guangdong province, and Zheng et.al. (2015) applied a two-stage probit model to discover

Figure 1: Percentage of firms[a] that failed in China, 1999-2007



[a] Covers manufacturing, mining and utilities Source: NBS data

Table 1: Definitions and descriptive statistics for variables used in determining firm survival, China 1998-2007

		firms that never failed		firms that failed		All firms	
Variable	Description	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
Not Assisted	Dummy variable = 1 if firm receives no financial assistance	0.379	0.485	0.429	0.495	0.385	0.486
Assistance rate<10.4%	Dummy variable = 1 for <10.4% rate of assistance[a]	0.169	0.375	0.136	0.343	0.165	0.372
Assistance rate 10.4%-<15.2%	Dummy variable = 1 for 10.4% to < 15.2% assistance	0.159	0.366	0.153	0.360	0.158	0.365
Assistance rate 15.2%-<18.7%%+	Dummy variable = 1 for 15.2% to 18.7% assistance	0.142	0.349	0.151	0.358	0.143	0.350
Assistance rate more than 18.7%	Dummy variable = 1 for more than 18.7%	0.152	0.359	0.131	0.338	0.149	0.357
High political links	High political affiliation with central or provincial governments	0.037	0.188	0.041	0.198	0.037	0.189
Medium political links	High political affiliation with local governments	0.358	0.479	0.450	0.498	0.368	0.482
No political links	No political Affiliation	0.605	0.489	0.509	0.500	0.595	0.491
Firm size	Ln the firm's total employees >300	4.749	1.061	4.347	1.078	4.705	1.070
Age	Firm age since its establishment	9.264	5.797	9.411	5.816	9.280	5.799
ln age	ln firm age	2.024	0.658	2.040	0.663	2.026	0.659
Foreign owned	Dummy variable = 1 if proportion of capital that is foreign-owned >=0.5[b]	0.077	0.267	0.043	0.202	0.074	0.261
State owned	Dummy variable = 1 if proportion of capital owned by state >=0.5 [b]	0.071	0.257	0.093	0.290	0.074	0.261
HK/Macau/Taiwan owned	Dummy variable = 1 if proportion of capital that is HK/Macau/Taiwan owned >=0.5 [b]	0.085	0.278	0.059	0.236	0.082	0.274
Collective owned	Dummy variable = 1 if proportion of capital owned by collectives >=0.5 [b]	0.115	0.320	0.165	0.371	0.121	0.326
Private owned	Dummy variable = 1 if proportion of capital owned privately >=0.5 [b]	0.651	0.477	0.640	0.480	0.650	0.477
Non-exporter	Dummy variable = 1 for firm that does not export	0.719	0.449	0.805	0.396	0.729	0.445
R&D	Dummy variable = 1 for firm undertaking R&D activities	0.106	0.308	0.044	0.206	0.099	0.299
ln TFP	ln total factor productivity estimated by GMM (Harris and Li, 2016)	-2.332	1.565	-2.373	1.596	-2.337	1.568
ln agglomeration	ln % of industry output (2-digit SIC) located in each province in which firm is located-MAR spillovers	1.871	1.114	1.772	1.199	1.860	1.124
ln herfindahl	ln herfindahl index of industrial concentration(by 2-digit SIC)	-6.459	1.070	-6.431	1.063	-6.456	1.069

ln diversification	ln proportion of 3-digit industries	-0.622	0.344	-0.656	0.376	-0.625	0.347
ln fixed costs	ln % of selling and distribution costs of firm's sales	1.061	0.878	1.043	0.924	1.059	0.883
City200	Dummy variable = 1 if firm located in top 200 cities based on population size	0.818	0.386	0.800	0.400	0.816	0.387
Tariff rate(Fob final goods)	Percentage rate of ad valorem tariff (fob tariff goods) for 44 industries	11.374	6.277	11.559	6.415	11.394	6.293
East Coast	Dummy variable for firm located in East Coast area[c]	0.703	0.457	0.661	0.473	0.699	0.459
Central	Dummy variable for firm located in Central China[d]	0.140	0.347	0.170	0.376	0.144	0.351
North east	Dummy variable for firm located in North Eas[e]	0.060	0.237	0.063	0.243	0.060	0.237
Western	Dummy variable for firm located in Western China[f]	0.097	0.296	0.105	0.307	0.098	0.297
%open	% of new firms opening in each year by province/industry	2.183	2.658	1.917	2.506	2.155	2.643
Period 2003-2007		0.695	0.460	0.686	0.464	0.694	0.461
N	Number of observations	1,179,462		143,445		1,322,907[g]	

[a] I.e., 100 × (financial subsidies + value of tax holidays) ÷ value added. All values are deflated by the industry producer price index. The choice of cut-off points for assistance rates were chosen based on estimating equation (2) using a wide range of alternatives and then using the model with the lowest log-likelihood value ('best' fit).[9]

[b] For firms with <50% share ownership in a particularly category, they were assigned to the largest ownership sub-group

[c] Guangdong, Fujian,Zhejiang,Jiangsu,Shandong,Hainan,Hebei,Beijing,Tianjin,Shanghai

[d] Hunan,Jiangxi,Hubei,Anhui,Henan,Shanxi

[e] Liaoning,Heilongjiang,Jilin

[f] Xinjiang,Tibet,Gansu,Qinghai,Sichuan,Chongqing,Yunnan,Guizhou,Guangxi,Inner Mongolia

[g] The unpublished appendix contains details of how through data cleaning and limitations we have this number of observations available for estimating equation (2) below.

the effects of political ties for Chinese TV manufacturing firms. A Probit model takes no account of the difference in length of time each firm was at risk of failure.[10] In contrast others have used duration models, including an Accelerated Failure Time model (Howell et. al., 2016), a Complementary log-log model (Zhang and Mohnen, 2013), and the Cox Proportional Hazard model (Li et al., 2005; Du and Girma, 2010; Audretsch et. al., 2016). Despite the strengths and weakness of each approach, our preference is for the Cox proportional hazard model (Cox, 1972), which has the advantage of placing no strict assumptions on the nature of the hazard probability distribution. Moreover, several papers have emphasized the role of firm age in firm survival (Li et.al.,2005; Lu and Xu, 2006; Batjargal, 2007; Chang and Xu, 2008); here we

[9] This approach also allowed to establish – see below – the cut-off points for the impact of assistance on the hazard rate of failure, establishing that an inverted U-shape relationship existed.

[10] We have estimated a duration model in preference to, say, a logit or probit model since the latter cannot take account of (right) censoring which occurs in 2007; and the logit model also does not distinguish how long a firm has been exposed to failure, and we would expect the risk of failure differs for new firms versus firms that have been operating for many years. However, as a check we have also compared our results to those obtained using a standard logit model, and the results (in terms of marginal effects) are very similar (see Table A.1 column 5).

incorporate this by allowing for different baseline hazards using stratification (based on different age subgroups) within the sample (Puranamet. al., 2006). We use four intervals: lower than 5 years, 5-10 years, 10-20 years and more than 20 years to capture the different risk rate of different age groups.

The hazard of failure for firm i conditioned on surviving up to the time t can be generally expressed as:

$$h(t,x) = h_0(t)\exp(\mathrm{x(t)}\beta) \quad (1)$$

where $h(t,x)$is the probability of failure in year t, having survived until year t, $h_0(t)$ is a non-parametric baseline hazard function[11] that is shared by all firms and $exp(x(t)\beta)$ is a parametric function of time-varying firm characteristics. In our study, $h(t,x)$ is the probability that a firm exits from the NBS dataset before t years, where t ranges between 0 to 29 years. [12]

The main purpose of this paper is to assess the extent to which government support from strong political connections and/or financial assistance affects firm survival. To test this hypothesis, we also add interaction terms between financial assistance and strong political links to the vector x in equation (1). We also know that after China joined the WTO, there was a significant increase in new (private sector) firm entry, which brings with it a higher rate of failure, as well as increased competition.

Therefore, we also introduce a time dummy to capture a likely higher rate of firm failure post China entering the WTO.[13]

$$h(t,x) = h_0(t)\exp[\beta_1 \mathrm{Assisted}_{it}(\times\ 2003-07\ \mathrm{dummy}) + \beta_2 \mathrm{Strong\ political\ links}_{it}\ (\times\ 2003-07\ \mathrm{dummy}) + \beta_3 \mathrm{Assisted}_{it}\ \times\ \mathrm{Strong\ political\ links}_{it}(\times\ 2003-07\ \mathrm{dummy}) + \beta_D \mathrm{D}] \quad (2)$$

Note two versions of equation (2) were estimated, one with and one without the shift dummy for 2003-07; hence the use of the parenthesis in the equation. Lastly, D presents all other variables in the model with all the variables that equation (2) defined in Table 1.

3.3 Control variables

The list of control variables to be included in the analysis follow theory and previous empirical studies. Firm-specific characteristics include the age, size (Che et.al., 2011; Audrestsch et. al.,

[11] As stated we adjust baseline hazards using stratification.
[12] Note, we do not use a fixed-effects hazard model where we would allow each firm to have its own intercept, since Allison (2002) has shown this leads to significant parameter bias due to the 'incidental parameter estimates' problem.
[13] Note, our time dummy takes on the value 1 for 2003-07, rather than 2002-07, to allow for a lag in the cet. par. immediate impact of WTO on the hazard rate of failure.

2016), ownership (Li, et.al., 2005; Du and Girma, 2010), export behaviour, whether undertaking R&D or not, as well as such factors as diversification, agglomeration, fixed costs, and industry concentration levels.

The age of the firm is used, in stratifying the baseline hazard, to control for the likelihood that older firms face a lower hazard rate of failure because of learning-by-doing effects (e.g. Jovanovic and Nyarko, 1996).[14] The firm's employment size proxies for cost advantages for larger firms due to operating at or above the minimum efficient scale (e.g. Agarwal and Audretsch, 2001) or because it has been shown that larger start-ups are more likely to grow than smaller ones (Fritsch et.al., 2006).

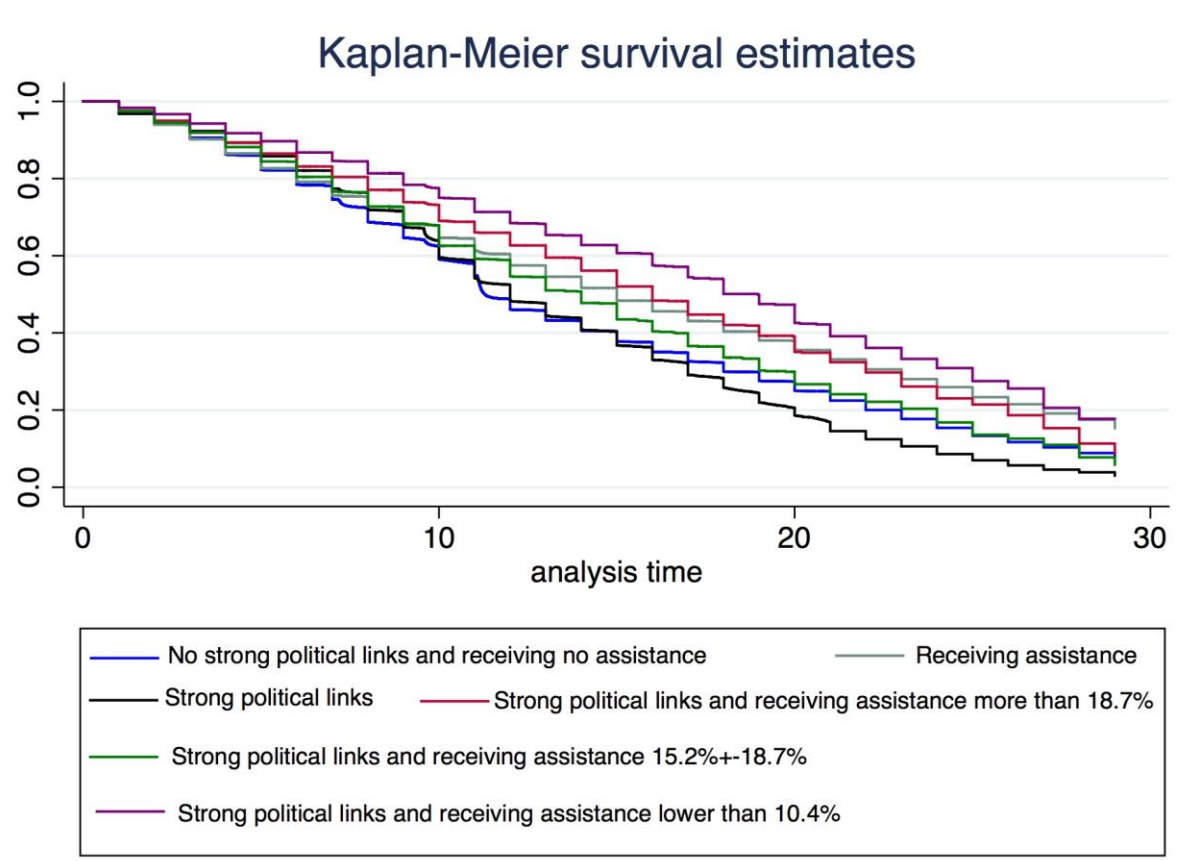
In addition, there is evidence that spatial co-location of firms has an impact on survival. Agglomeration externalities are usually distinguished in the literature according to whether they are an intra- or inter-industry phenomenon. Intra-industry externalities are termed MAR (Marshall, 1890; Arrow, 1971; Romer, 1986) or localization externalities, while inter-industry externalities are termed Jacobian (Jacobs, 1970, 1985) or urbanization externalities. The mechanisms that give rise to agglomeration externalities can support both localization and urbanization externalities; i.e., firms may learn from other firms in the same industry and from firms in another industry, in a particular location. We also include a dummy that takes on a value of 1 for those firms located in one of the top 200 cities (based on population size in year *t*), as an additional proxy for potential negative spillovers (i.e. 'congestion' costs) in large Chinese cities that is related to overall density of local economic activity. Ciccone and Hall (1996) claimed that the denser the local economy, the more accessible were high quality local services and demand, therefore reducing the likelihood of firm failure.

Export behaviour is expected to have a positive effect on firm survival as exporting firms tend to have higher productivity and profitability to help them survive (Helpman, 2006; Salomon and Shaver,2005; Inui, et. al., 2017). Many studies had pointed out that firms undertaking R&D activities will affect firm survival (e.g., Franco et. al., 2009; Kim and Lee, 2016); the innovation effort of a firm is related to higher efficiency (Esteve-Pérez and Mañez-Castillejo, 2008) and/or higher competitiveness (Cefis and Marsili, 2006), thus providing such firms with the capabilities leading to a greater probability of survival. The market power of firms is usually included to take account of overall competition effects; Staber (1998) suggested that balanced competition can foster firm survival in a volatile market environment, while stronger

[14] Note, age is not directly included as this would be fully collinear with the dependent variable measuring survival duration.

competition can induce firms into implementing R&D activities, adopting new technologies and operating more efficiently (Nickell, 1996; Meyer and Vickers, 1997). Lastly, we follow others and include such variables which may impact on firm failure as fixed costs (e.g. Lederman, et.al. 2016), total factor productivity (e.g. Che, et. al. 2011; Zheng, et. al., 2015); as well as the geographic region in which the firm is located (Jovanovic, 1982; Acs and Plummer, 2005; Cainelli, et. al. 2014).

Figure 2: Survival rate among different subgroups estimated by Kaplan-Meier estimator



4. Results

4.1 Descriptive statistics

Table 1 presents the summary statistics of the variables used in the survival analysis. Means and standard deviations of the main variables used in estimation are reported for firms that

never failed (column 1), firms that failed (column 2) and all firms (column 3)[15]. Overall, 37% of firms failed over the period considered, with (in terms of our univariate analysis) firms receiving assistance having a higher survival rate. The table shows that overall failing firms are more likely to be non-assisted, smaller, older, less efficient and non-exporters. Regarding the industrial-specific characteristics, surviving firms seem to benefit from agglomeration and market competition.

Using a non-parametric Kaplan-Meier survival estimator Figure 2 plots the survival rates for various sub-groups; firms with strong political links which also received assistance lower than 10. 4% had the highest survival rate while firms with strong political links had the lowest survival rates.

Table 2: The overall effects of key variables on firm failure estimated by Cox proportional Hazard Model

	(1) Assisted model: no time dummy	(2) Assisted model: with time dummy	(3) Assistance rate model: no time dummy	(4) Assistance rate model: with time dummy
Receiving assistance	-0.072***	-0.068***	—	—
Assistance rate<10.4%	—	—	-0.165***	-0.162***
Assistance rate10.4%–<15.2%	—	—	-0.056***	-0.050***
Assistance rate 15.2%–<18.7%	—	—	0.049***	0.057***
Assistance rate 18.7%+	—	—	-0.114***	-0.113***
Strong political links	-0.033*	-0.044**	-0.026	-0.036*
State-owned firms	-0.151***	0.045***	-0.153***	0.043***
Private-owned firms	-0.143***	-0.162***	-0.142***	-0.161***
Period 2003-2007	—	0.423***	—	0.424***
Observations	1,322,907	1,322,907	1,322,907	1,322,907

Note: Stratified on age, *** /** / * denote statistical significance at the 1%/5%/10% levels. Based on results in Table 3.

4.2 The main results

Table 2 reports the key results for the overall effects of receiving assistance, having strong political links, whether State-owned/Private-owned as well as differences pre- and post-WTO membership, on the likelihood of firm failure.[16] Columns (1) and (2) report the results when assistance is entered as a 0/1 dummy depicting whether any financial assistance was received or not; cet. par., firms receiving assistance were around 7% less likely to fail. Having strong

[15] A t-test for the equality of the means of failing firms and non-failing firms all reject the null hypothesis at the 1% significance level.

[16] The full set of results are set out in Table 3. The results in Table 2 show the overall marginal effects (i.e., the probability of a change in the hazard rate) when all interactions effects have been 'solved out' (e.g., $\frac{\partial h(t,X)}{\partial strong\ political\ links_t}$). Since it is not possible to change the value of the interaction variables (in Table 3) without changing one of their constituent variables, the marginal effects on the interactions are, in isolation, of limited use. Specifically, if all three terms $x_1, x_2, x_1 \times x_2$ enter the model, then changing the interaction term $x_1 \times x_2$ cannot impact on $h(t, X)$ independently of changing x_1, x_2. Nevertheless, the interaction terms allow us to comment on the underlying factors leading to the overall impact of a variable, and we shall make use of these when interpreting what has been happening, particularly when comparing 1998-2002 with 2003-07.

political links reduced the hazard rate by some 3-4% (depending on whether the time dummy enters equation 2 or not), while being a privately-owned firm resulted in a lower probability of failure by some 14-16%. When the time dummy is included, the results show that post-2002 firms experienced over a 42% higher likelihood of failure and being State-owned increased failure by some 4%. When the time dummy is omitted, being an SOE reduced the likelihood of failure by over 15%, indicating that there was a significant change in SOE failure rates after China joined the WTO, which would be missed in a (mis-specified) model that omitted the time dummy. This result is discussed below more fully.

Columns (3) and (4) represent the results when different assistance rates are entered into the model; the results show the impact is an inverted U-shape; the hazard rate increased with higher rates of assistance up to a 18.7% assistance rate, although for firms receiving above 18.7% assistance their hazard rate fell.[17]

Table 3 reports the disaggregate effects of assistance, strong political links and ownership structure, as well as the impact on the hazard rate of the other covariates. We concentrate on the results in column (4) which is the preferred model. Compared to Table 2, which shows the overall (net) impact of firms receiving different rates of assistance, the results in Table 3 show that (cet. par.) the impact of receiving assistance on lowering the hazard rate of failure fell substantially after 2002; the marginal effects for the interactions with the time dummy are all positive and large (including for firms receiving 18.7%+ assistance).

Strong political links lowered the hazard rate of failure; however, firms with links to central or provincial governments who also received financial assistance had a survival probability that was (cet. par.) up to twice as strong as the effect of only having strong political links – the exception here being firms with an assistance rate between 10.4% and 15.2%, where there was no additional benefit from assistance.[18] Coupled with the results above – that overall the impact of receiving assistance on lowering the hazard rate of failure fell substantially after 2002 – suggests that post-WTO entry, the Chinese authorities were targeting joint financial and

[17] An agency model, of why modest levels of financial are beneficial in terms of a firm's level of TFP, is set out in the appendix in Harris and Li (2016). Such assistance can lower the user cost of capital stock, therefore 'vintage' capital stock can be replaced by more efficient, newer capital equipment and/or allowing firms to spend more on R&D/improving product quality; however, when government assistance becomes too high, 'rent seeking' will dominate managerial effort. Our results provide support for this approach, but in the case of firm survival, when assistance passes a certain level, and even if 'rent seeking' dominates, presumably the firm can survive (cet. par.) because of the large subsidies being received (note, our results below in Table 3 suggest that receiving large subsidies may be less able to protect privately-owned firms).

[18] Note, Table U.1 in the unpublished appendix shows that strong political links × assistance × period 2003-07 dummy was not significant, and so we omit this from Table 3.

Table 3: Parameter estimates of estimated by Cox proportional Hazard Model (equation 2)

VARIABLES	(1) Assisted model: no time dummy	(2) Assisted model: with time dummy	(3) Assistance rate model: no time dummy	(4) Assistance rate model: with time dummy
Receiving assistance	-0.068***	-0.205***	—	—
Receiving assistance × Period 2003-2007	—	0.204***	—	—
Assistance rate<10.4%	—	—	-0.159***	-0.252***
Assistance rate10.4%–<15.2%	—	—	-0.056***	-0.192***
Assistance rate 15.2%–<18.7%	—	—	0.054***	-0.116***
Assistance rate 18.7%+	—	—	-0.110***	-0.267***
Assistance rate<10.4% × Period 2003-2007	—	—	—	0.141***
Assistance rate 10.4%–<15.2% × Period 2003-2007	—	—	—	0.206***
Assistance rate 15.2%–<18.7% × Period 2003-2007	—	—	—	0.256***
Assistance rate 18.7%+ × Period 2003-2007	—	—	—	0.228***
Strong political links	-0.137***	-0.208***	-0.131***	-0.205***
Strong political links × Period 2003-2007		0.145*	—	0.147*
Strong political links × Receiving Assistance	-0.107***	-0.131***	—	—
Strong political links × Assistance rate<10.4%	—	—	-0.165***	-0.216***
Strong political links × Assistance rate 10.4%-<15.2%	—	—	-0.008	-0.029
Strong political links × Assistance rate 15.2%-<18.7%	—	—	-0.128***	-0.129***
Strong political links × Assistance rate 18.7%	—	—	-0.089**	-0.102**
Period 2003-2007	—	0.273***	—	0.271***
State owned	-0.160***	-0.479***	-0.162***	-0.481***
State owned × Period 2003-2007	—	0.750***	—	0.752***
.	0.250***	0.317***	0.248***	0.313***
Strong political links × State owned × Period 2003-2007	—	-0.353***	—	-0.347***
Private owned	-0.152***	-0.134***	-0.151***	-0.134***
Private owned × Period 2003-2007	—	-0.053***	—	-0.050***
Strong political links × Private owned	0.232***	0.239***	0.227***	0.237***
Strong political links × Private owned × Period 2003-2007	—	-0.037	—	-0.041
Foreign owned	-0.398***	-0.419***	-0.406***	-0.427***
HK/Macau/Taiwan owned	-0.229***	-0.250***	-0.240***	-0.260***
Firm size	-0.345***	-0.346***	-0.342***	-0.343***
ln age	-3.774***	-3.821***	-3.771***	-3.820***
No political links	-0.298***	-0.316***	-0.296***	-0.315***
Non-exporter	0.159***	0.171***	0.164***	0.177***
R&D	-0.619***	-0.630***	-0.614***	-0.624***
ln agglomeration	-0.006*	-0.000	-0.006*	0.000
ln Herfindahl	-0.084***	0.034***	-0.083***	0.035***
ln Diversification	-0.188***	-0.166***	-0.190***	-0.168***
ln Fixed costs	0.005*	0.008***	0.007**	0.010***
City200	0.066***	0.051***	0.067***	0.052***
%open	-0.075***	-0.082***	-0.075***	-0.083***
Tariff rate	-0.019***	0.017***	-0.018***	0.018***
East Coast	-0.121***	-0.148***	-0.112***	-0.139***
North East	-0.165***	-0.184***	-0.166***	-0.187***
Western	-0.246***	-0.257***	-0.245***	-0.256***
ln TFP	-0.167***	-0.199***	-0.165***	-0.198***
Industry dummies	yes	yes	yes	yes
Log likelihood	-1594389.4	-1592402.9	-1594131.2	-1592104.9
Observations	1,322,907	1,322,907	1,322,907	1,322,907

Note: Stratified on age, *** /** / * denote statistical significance at the 1%/5%/10% levels.

political help more specifically on firms more likely to survive. The results regarding state-owned firms – shown in column 4 in Table 2 to be associated with overall a higher failure rate – can also be understood better using the disaggregated results in Table 3 (column 4). State-owned firms generally had a lower hazard rate of failure in 1998-2002, while those with strong political links had (cet. par.) a 31.3% higher hazard rate except post-2002 where the negative joint-effect of being State-owned with political links is effectively cancelled out. This again suggests that post-WTO entry the authorities helped politically and financially the 'better' SOEs.

For private firms, the hazard rate of failure was lower, but firms in this sector with strong political links had (cet. par.) a 24% higher risk of failure. Private sector firms that resort to political connection with governments may introduce interventions which will distort their goals, e.g. government may extract benefits from connected private firms, which may be at the expense of other shareholders. And governments may pursue social goals instead of firm performance; Boubakri et.al. (2008) claimed that firms with political connection will be reluctant to cut their employment to reduce operation costs because of government objectives. Moreover, the alliance between business and politics can generate rent seeking and thus harm market competition (Du and Girma, 2010).

Turning to other covariates, foreign-owned firms (vis-à-vis other ownership sub-groups) enjoyed the lowest hazard rate of failing; this is unsurprising given previous evidence that foreign owned firms often have higher TFP (Ding et. al., 2016), they are less dependent on the local economy (Bernard and Jensen, 2007) and governments usually provide significant benefits to encourage foreign-owned companies to settle in China. Generally older (Lin and Huang, 2008; Chang and Xu, 2008; Batjargal, 2007; Du and Girma, 2010), larger-sized (Cheet. al., 2011) and more efficient firms enjoy a higher survival rate. Firms involved in exporting are less likely to fail due to their higher efficiency associated with learning-by-exporting effects. Firms engaging with R&D activities are much more likely to survive (cet. par. 62% more likely). This is in consistent with the previous research that innovation is helpful

for new firms to settle into a market and undermine incumbent firms (Schumpeter, 1984; Baumol, 2002; Cefis and Marsili, 2005). For industrial-specific variables, firms located in more diversified are less likely to fail, while firms located in the top 200 cities have slightly higher failure rates presumably due to higher levels of competition. By contrast, the hazard rate tends to be lower if firms were located in the western part of China; this is likely because of the supportive plans of the Chinese central government which has targeted this part of China for

increased development.[19] Regarding market power (as proxied by the Herfindahl index), firms that operated in less competitive markets on average survived longer.

Tables 4: Parameter estimates of estimated by Cox proportional Hazard Model on "matched" data (equation 2)[20]

	(1) Table 2 results	(2) Matched on assistance (1:1)	(3) Matched on strong political links (1:1)	(4) Matched on both assistance and strong political links (1:5)
Assistance rate<10.4%	-0.162***	-0.146***	-0.269***	-0.251***
Assistance rate10.4%–<15.2%	-0.050***	-0.036***	-0.111***	-0.023
Assistance rate 15.2%–<18.7%	0.057***	0.077***	0.021	0.058**
Assistance rate 18.7%+	-0.113***	-0.072***	-0.156***	-0.084***
Strong political links	-0.036*	-0.032	-0.025	-0.108***
State-owned firms	0.043***	0.111***	-0.048	0.016
Private-owned firms	-0.161***	-0.168***	-0.129***	-0.142***
Period 2003-2007	0.424***	0.438***	0.413***	0.414***
Observations	1,322,907	954,465	91,816	128,266

Note: Stratified on age, *** /** / * denote statistical significance at the 1%/5%/10% levels. Based on results in Table U.4.

4.3 Robustness checks

We have used alternative duration models to ensure that our results are not driven specifically by different model specifications – such as the discrete time hazard complementary log-log model and the Accelerated Failure Time model. The results are presented in columns (1-3) in Table A.1 in the Appendix. Additionally, in order to address any potential selection bias due to financial assistance not being randomly assigned to firms (e.g., it may be the result of other factors such as management efforts that are correlated with the error term in the Cox model), we apply a propensity score matching method. Using a logit model[21] to predict the probability

[19] This started in 1999 through a series of policies, such as the Western Development Program, aimed at improving funding and support for R&D, help high-tech industries settlement in the west, and also stimulating Foreign Direct Investment (for details see Lai, 2002). In 2000, the State published 'A Catalogue of Advantaged Industries for Foreign Investment in the Central and Western Regions'; the Catalogue has been revised four times since (see also Luo and Park, 2001).

[20] We have chosen different ratios of treated to control (i.e., 1:1 separately for firms who receives financial assistance and firms who built strong political links, 1:5 for firms who receives both financial assistance and built strong political links. Different for the last as it involved so few firms in the treatment group, only 26,362 observations.

[21] The equation we used was as follows: for firms receiving financial assistance/those with strong political links/and for those with strong political links and receiving assistance, we estimate three separate 0/1 models comprising:

Assistance or Strong politcial links or both $_{it} = \alpha_0 + \alpha_1 strong\ political\ links_{it} +$
$\alpha_2 strong\ political\ links_{it} \times state - owned_{it} + \alpha_3 high\_politics_{it} \times private - owned_{it} + \alpha_x X_{it} + \mu_{it}$

Note, for firms building strong political links or firms receive both types of assistance, we omit the terms involving strong political links on the right-hand-side of the equation. Note X_{it} contained the control variables listed in Table

of receiving assistance based on firm characteristics and estimating the logit model year by year, we use one-to-one 'matching' to create a control group of firms who did not receive financial assistance but who otherwise had similar characteristics to those that did (the STATA procedure PSMATCH2 used). We repeated this 'matching' approach to create different control groups for firms who build strong political links and for those receiving both financial and political assistance. To test for the appropriateness of these matching procedures, we use balancing tests (the STATA procedure PSTEST used) as well as graphical tests. These balancing tests are reported in the unpublished appendix Tables U.2-U3 and Figures U.1-U3. The results from using "matched" data are shown in Table 4,[22] indicating that our earlier results are generally robust even considering the potential selection bias, although of course different specifications do produce different specific parameter estimates.

5. Conclusions

Using micro-economic data from the NBS dataset over the period of 1998-2007, we apply the Cox proportional Hazard Model to examine the impacts of financial assistance and strong political links on firm survival (including the interaction of these two effects). We also take into account the effects of China joining WTO at the end of 2001.

The major results we obtain show that firms receiving assistance can survive longer; with firms receiving less than 10. 4% assistance enjoying the lowest hazard rate of failure. Also, firms with strong political links survive longer especially if they also receive (modest levels of) financial assistance. Over time, firm survival falls significantly especially after China joins the WTO, especially for State-owned firms. Thus, our findings provide new insights into the role of government support (both financial and political) in a transition economy, and especially in one that moved from being strongly state controlled to allowing significant competition and private ownership.

In terms of policy implications, our findings indicate that in China's transition period (up to 2002), both financial and political assistance exerted a positive effect on firm survival, while after joining WTO the effect turns negative. Thus, when deciding who should be assisted in

1. Also, since firms can get assistance on an intermittent basis (some years and not others), in order to avoid the matching approach selecting firms for the control group that received assistance in an earlier year but not in a later year (with the latter being the year it is chosen to enter the control group), we apply the logit model year by year.
[22] Table U.4 has the full results (comparable to Table 3) for the 'matched' models.

regions with less openness, government should grant support to finance learning-by-doing in firms to help them gain an ability to survive as competition intensifies, while for regions with more openness, government should reduce direct interventions. Moreover, when deciding how much should be granted, government should grant modest levels of assistance both financially and politically (especially to privately-owned firms).

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Appendix Table A.1 The coefficients of alternative models[a]

VARIABLES	(1) Weibull	(2) Complementary log-log model	(3) AFT	(4) COX	(5) logit
Receiving assistance	-0.057***	-0.073***	0.071***	-0.068***	-0.076***
Strong political links	-0.087**	-0.094**	0.181***	-0.137***	-0.100**
Strong political links × Receiving Assistance	-0.188***	-0.116***	0.122***	-0.107***	-0.134***
State owned	-0.113***	-0.189***	-0.016	-0.160***	-0.184***
Strong political links × State owned	0.140***	0.254***	-0.175***	0.250***	0.281***
Private owned	-0.137***	-0.215***	0.118***	-0.152***	-0.234***
Strong political links × Private owned	0.237***	0.215***	-0.300***	0.232***	0.245***
Foreign owned	-0.329***	-0.525***	0.317***	-0.398***	-0.555***
HK/Macau/Taiwan owned	-0.191***	-0.326***	0.145***	-0.229***	-0.347***
Firm size	-0.347***	-0.407***	0.226***	-0.345***	-0.438***
ln age	-3.911***	-0.751***	0.686***	-3.774***	0.012***
No political links	-0.258***	-0.324***	0.361***	-0.298***	-0.342***
Non-exporter	0.162***	0.191***	-0.094***	0.159***	0.199***
R&D	-0.647***	-0.670***	0.563***	-0.619***	-0.698***
ln agglomeration	0.016***	-0.011***	0.036***	-0.006*	-0.015***
ln Herfindahl	-0.067***	-0.061***	0.142***	-0.084***	-0.055***
ln Diversification	-0.139***	-0.218***	0.296***	-0.188***	-0.244***
ln Fixed costs	0.012***	-0.005	-0.006**	0.005*	-0.003
City200	0.094***	0.069***	-0.142***	0.066***	0.078***
%open	-0.015***	-0.007***	0.054***	-0.075***	-0.056***
Tariff rate	-0.087***	-0.056***	0.137***	-0.019***	-0.007***
East Coast	-0.097***	-0.129***	0.104***	-0.121***	-0.136***
North East	-0.180***	-0.144***	0.177***	-0.165***	-0.164***
Western	-0.163***	-0.252***	0.333***	-0.246***	-0.271***
ln TFP	-0.156***	-0.231***	0.135***	-0.167***	-0.250***
Industry Dummies	yes	yes	yes	yes	yes
logd		0.639***			
Constant	0.744***	-0.452***	1.469***		-0.618***
Log likelihood	-166971.58	-432078.35	-285417.29	-1594389.4	-443428.28
Observations	1,322,907	1,322,907	1,322,907	1322907	1322907

[a] Note: For 1% , 5% and 10% significance levels are presented by *** , **, *.

Unpublished appendix

Table U.1 Disaggregate effects of financial assistance and strong political links on firm survival[a]

VARIABLES	(1) assisted with time	(2) assistance rate with time
Receiving assistance	-0.206***	—
Assistance rate<10.40%	—	-0.255***
Assistance rate10.40%–<15.15%	—	-0.196***
Assistance rate 15.15%–<18.67%	—	-0.115***
Assistance rate 18.67%+	—	-0.266***
Receiving assistance × Period 2003-2007	0.206***	—
Strong political links × Period 2003-2007	0.165**	0.163**
Strong political links × Receiving Assistance	-0.102**	—
Strong political links × Receiving Assistance× Period 2003-2007	-0.044	—
Strong political links	-0.219***	-0.214***
Period 2003-2007	0.272***	0.271***
Assistance rate<10.40% × Period 2003-2007	—	0.146***
Assistance rate 10.40%–<15.15% × Period 2003-2007	—	0.211***
Assistance rate 15.15%–<18.67% × Period 2003-2007	—	0.255***
Assistance rate 18.67%+× Period 2003-2007	—	0.226***
Strong political links × Assistance rate<10.40%	—	-0.132
Strong political links × Assistance rate 10.40%-<15.15%	—	0.082
Strong political links × Assistance rate 15.15%-<18.67%	—	-0.179**
Strong political links × Assistance rate 18.67%	—	-0.147*
Strong political links × Assistance rate<10.40%× Period 2003-2007	—	-0.119
Strong political links × Assistance rate 10.40%-<15.15%× Period 2003-2007	—	-0.159
Strong political links × Assistance rate 15.15%-<18.67%× Period 2003-2007	—	0.068
Strong political links × Assistance rate 18.67%× Period 2003-2007	—	0.058
State owned	-0.479***	-0.482***
Strong political links × State owned	0.320***	0.316***
State owned × Period 2003-2007	0.751***	0.752***
Strong political links × State owned × Period 2003-2007	-0.358***	-0.351***
Private owned	-0.134***	-0.134***
Strong political links × Private owned	0.241***	0.236***
Private owned × Period 2003-2007	-0.053***	-0.051***
Strong political links × Private owned × Period 2003-2007	-0.039	-0.040
Foreign owned	-0.419***	-0.427***
HK/Macau/Taiwan owned	-0.250***	-0.260***
Firm size	-0.346***	-0.343***
ln age	-3.821***	-3.821***
No political links	-0.316***	-0.315***
Non-exporter	0.171***	0.177***
R&D	-0.630***	-0.624***
ln agglomeration	-0.000	0.000
ln Herfindahl	0.034***	0.035***
ln Diversification	-0.166***	-0.168***

ln Fixed costs	0.008***	0.010***
City200	0.051***	0.052***
Tariff rate	0.017***	0.018***
%open	-0.082***	-0.083***
East Coast	-0.148***	-0.139***
North East	-0.184***	-0.187***
Western	-0.257***	-0.256***
ln TFP	-0.199***	-0.198***
Industry dummies	yes	yes
Log likelihood	-1592402.6	-1592102.2
Observations	1,322,907	1,322,907

[a] Note *** p<0.01, ** p<0.05, * p<0.1

Figure U.1: Kernel density functions for "treated" and "control" group before and after match for firms receiving financial assistance(Year=1999)

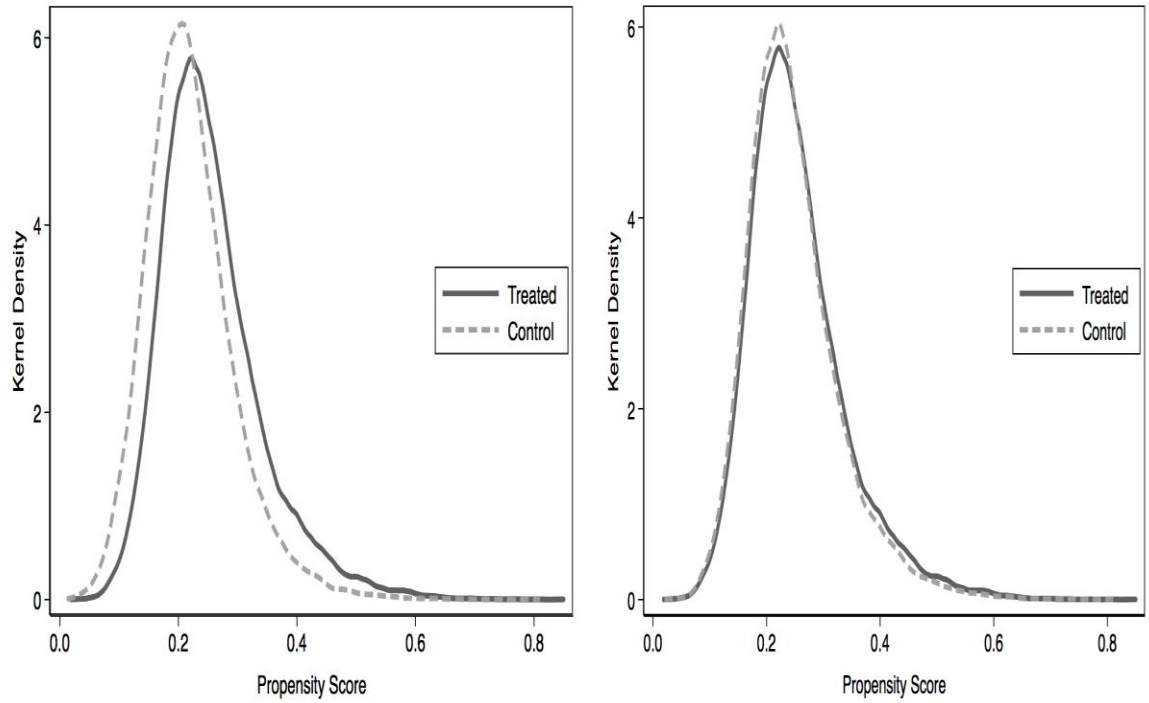

Figure U.2: Kernel density functions for "treated" and "control" group before and after match for firms with strong political links

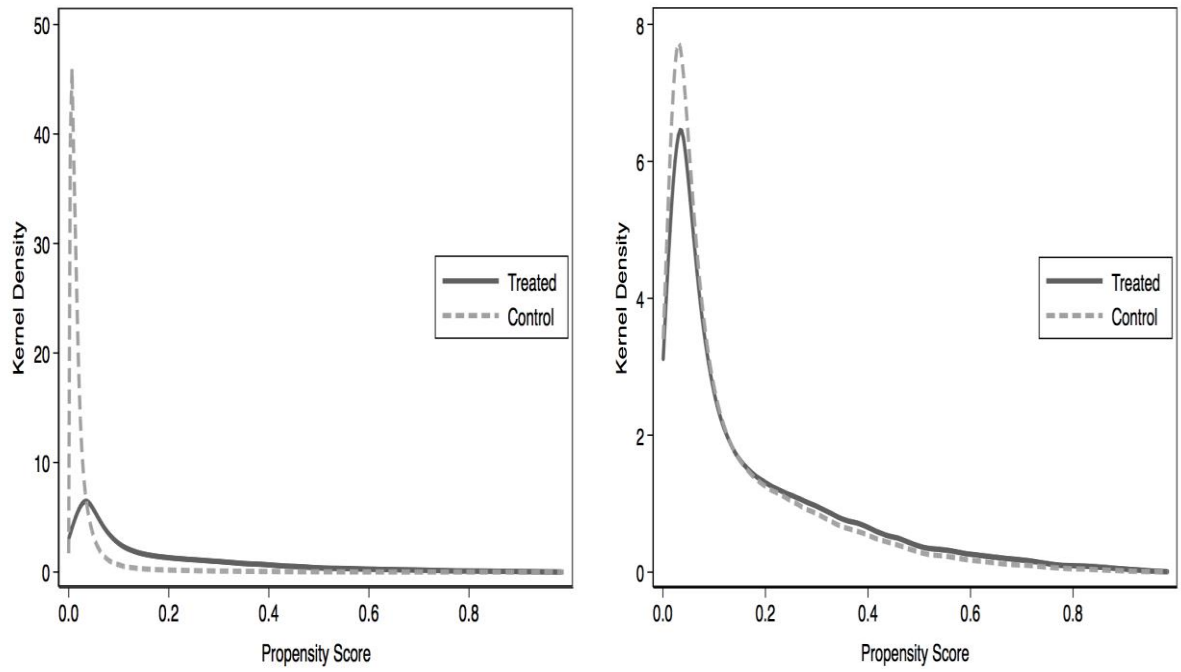

Figure U.3: Kernel density functions for "treated" and "control" group before and after match for firms with financial assistance and strong political links

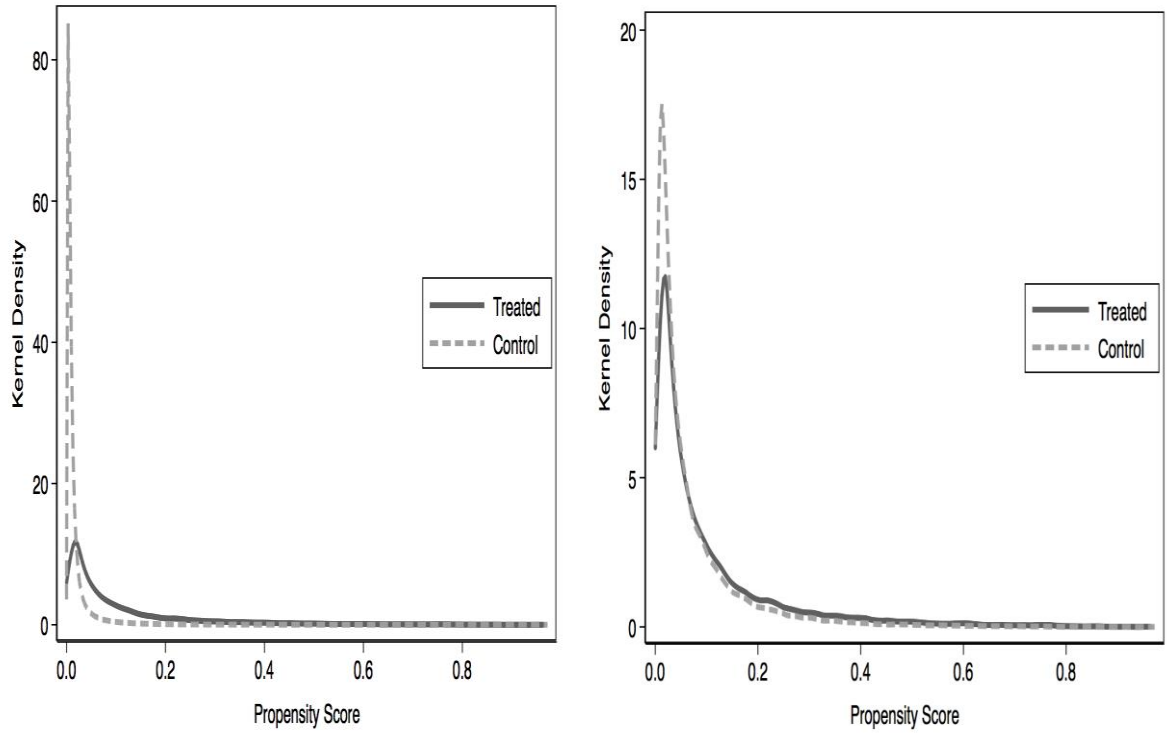

Table U.2 Balancing test results for firms receiving financial assistance

Variables		1998 Treated	1998 Control	1998 %Bias	1999 Treated	1999 Control	1999 %Bias	2000 Treated	2000 Control	2000 %Bias	2001 Treated	2001 Control	2001 %Bias	2002 Treated	2002 Control	2002 %Bias
Strong political links	Unmatched	0.043	0.069	-11.300	0.063	0.048	1.700	0.050	0.071	-9.000	0.045	0.063	-8.000	0.040	0.059	-8.800
	Matched	0.044	0.043	0.600	0.063	0.059		0.050	0.049	0.400	0.045	0.043	1.100	0.040	0.038	0.800
State owned	Unmatched	0.119	0.213	-25.300	0.141	0.164	-0.200	0.114	0.203	-24.600	0.087	0.162	-23.100	0.074	0.131	-19.000
	Matched	0.121	0.123	-0.400	0.141	0.142		0.114	0.114	0.000	0.082	0.079	0.700	0.068	0.067	0.400
Strong political links SOE	Unmatched	0.021	0.037	-9.400	0.029	0.027	0.100	0.020	0.035	-9.000	0.019	0.032	-8.700	0.016	0.029	-8.600
	Matched	0.022	0.021	0.200	0.029	0.029		0.020	0.021	-0.200	0.018	0.018	0.100	0.015	0.014	0.500
Private owned	Unmatched	0.320	0.347	-5.700	0.388	0.367	-0.200	0.435	0.462	-5.400	0.511	0.556	-9.000	0.563	0.635	-14.800
	Matched	0.326	0.325	0.300	0.388	0.388		0.440	0.440	0.100	0.549	0.545	0.900	0.626	0.612	2.900
Strong political links private-owned	Unmatched	0.013	0.020	-6.100	0.023	0.014	2.600	0.017	0.022	-3.700	0.016	0.020	-3.300	0.015	0.021	-4.400
	Matched	0.013	0.011	1.100	0.023	0.019		0.018	0.017	0.100	0.016	0.015	1.400	0.017	0.016	0.500
Foreign owned	Unmatched	0.087	0.050	14.800	0.077	0.062	0.500	0.084	0.041	17.900	0.088	0.042	19.100	0.095	0.040	21.700
	Matched	0.085	0.084	0.500	0.077	0.076		0.081	0.086	-2.000	0.070	0.072	-0.800	0.063	0.068	-2.100
HK/Macau/Taiwan owned	Unmatched	0.118	0.050	24.800	0.065	0.065	-0.300	0.115	0.051	23.100	0.118	0.054	23.200	0.110	0.049	22.800
	Matched	0.106	0.108	-0.700	0.065	0.066		0.110	0.109	0.200	0.092	0.097	-1.700	0.078	0.080	-0.900
Firm size	Unmatched	4.942	4.914	2.500	5.067	4.831	1.600	4.865	4.762	9.300	4.821	4.732	8.100	4.820	4.716	9.600
	Matched	4.936	4.946	-0.900	5.067	5.049		4.857	4.854	0.300	4.791	4.810	-1.700	4.779	4.777	0.100
ln age	Unmatched	1.949	2.034	-12.800	2.100	2.108	0.600	2.022	2.094	-11.000	2.002	2.073	-10.200	2.022	2.082	-8.800
	Matched	1.955	1.946	1.400	2.100	2.097		2.024	2.006	2.700	2.007	1.996	1.600	2.023	2.018	0.800
No political links	Unmatched	0.226	0.179	11.700	0.246	0.211	-1.600	0.176	0.172	1.000	0.385	0.336	10.200	0.447	0.426	4.300
	Matched	0.221	0.216	1.300	0.246	0.253		0.176	0.173	0.900	0.377	0.379	-0.400	0.448	0.451	-0.700
Non-exporter	Unmatched	0.676	0.770	-21.100	0.669	0.738	-1.900	0.700	0.774	-16.800	0.696	0.760	-14.400	0.686	0.762	-17.200
	Matched	0.684	0.695	-2.300	0.669	0.678		0.703	0.709	-1.400	0.713	0.712	0.400	0.714	0.712	0.500
R&D	Unmatched	0.091	0.089	0.700	0.135	0.078	1.700	0.113	0.099	4.500	0.104	0.099	2.000	0.117	0.109	2.300
	Matched	0.092	0.094	-0.900	0.135	0.130		0.112	0.114	-0.600	0.105	0.108	-1.200	0.118	0.116	0.400
ln agglomeration	Unmatched	1.852	1.710	13.500	1.863	1.795	0.800	1.791	1.642	13.400	1.818	1.718	8.800	1.806	1.791	1.300

ln herfindahl	Matched	1.842	1.836	0.600	1.863	1.854		1.789	1.772	1.600	1.814	1.803	0.900	1.816	1.800	1.400
	Unmatched	-6.102	-6.072	-2.800	-6.094	-6.107	1.200	-6.140	-6.090	-5.000	-6.129	-6.084	-4.900	-6.191	-6.141	-5.600
ln diversification	Matched	-6.104	-6.109	0.600	-6.094	-6.106		-6.145	-6.148	0.400	-6.144	-6.147	0.300	-6.213	-6.202	-1.300
	Unmatched	-0.412	-0.444	8.800	-0.377	-0.423	0.000	-0.654	-0.702	12.300	-0.637	-0.671	8.900	-0.632	-0.638	1.800
ln fixed costs	Matched	-0.414	-0.414	-0.100	-0.377	-0.377		-0.654	-0.656	0.500	-0.637	-0.641	1.000	-0.627	-0.630	1.000
	Unmatched	1.128	1.177	-5.300	1.186	1.150	-1.400	1.152	1.153	-0.100	1.149	1.122	2.900	1.142	1.098	4.800
ln TFP	Matched	1.133	1.141	-0.900	1.186	1.199		1.153	1.169	-1.800	1.147	1.161	-1.500	1.131	1.137	-0.700
	Unmatched	-2.114	-2.633	29.400	-2.084	-2.330	-1.100	-2.301	-2.698	22.600	-2.206	-2.594	22.400	-2.190	-2.466	16.300
Rubin's B	Matched	-2.142	-2.166	1.400	-2.084	-2.065		-2.302	-2.309	0.400	-2.185	-2.217	1.900	-2.148	-2.193	2.600
	Unmatched	45.3*			34.8*			42.4*			42.0*			42.4*		
Rubin's R	Matched	4.400			4.600			4.700			4.600			5.400		
	Unmatched	1.070			1.130			1.110			1.070			1.330		
	Matched	0.920			1.130			0.880			0.900			0.940		

		2003			2004			2005			2006			2007		
Variables		Treated	Control	%Bias	Treated	Control	%Bias	Treated	Control	%Bias	Treated	Control	%Bias	Treated	Control	%Bias
Strong political links	Unmatched	0.034	0.047	-6.300	0.030	0.042	-6.200	0.026	0.036	-5.800	0.023	0.030	-4.200	0.021	0.025	-3.000
	Matched	0.035	0.035	0.000	0.030	0.028	1.200	0.026	0.027	-0.300	0.024	0.023	0.000	0.021	0.022	-0.400
State owned	Unmatched	0.056	0.101	-16.800	0.040	0.075	-14.900	0.034	0.058	-11.500	0.028	0.046	-9.300	0.021	0.028	-4.800
	Matched	0.053	0.055	-0.700	0.037	0.037	0.000	0.032	0.033	-0.500	0.027	0.028	-0.800	0.021	0.021	-0.400
Strong political links SOE	Unmatched	0.014	0.023	-6.700	0.012	0.021	-6.800	0.009	0.016	-5.800	0.008	0.013	-4.700	0.006	0.008	-2.000
	Matched	0.013	0.013	0.200	0.012	0.011	0.600	0.009	0.008	0.600	0.008	0.008	0.200	0.006	0.006	-0.100
Private owned	Unmatched	0.632	0.707	-16.000	0.675	0.759	-18.700	0.710	0.791	-18.900	0.737	0.809	-17.200	0.760	0.839	-19.800
	Matched	0.673	0.670	0.500	0.757	0.755	0.400	0.763	0.760	0.700	0.798	0.797	0.300	0.808	0.809	-0.100
Strong political links private-owned	Unmatched	0.014	0.017	-2.400	0.011	0.014	-2.300	0.013	0.016	-2.400	0.012	0.014	-1.800	0.011	0.013	-2.200
	Matched	0.015	0.014	0.300	0.012	0.011	0.900	0.013	0.014	-0.400	0.012	0.012	0.100	0.012	0.012	0.100
Foreign owned	Unmatched	0.091	0.034	23.800	0.091	0.034	23.600	0.097	0.041	22.500	0.095	0.039	22.200	0.091	0.041	20.100

HK/Macau/Taiwan owned	Matched	0.067	0.068	-0.600	0.047	0.049	-0.700	0.067	0.068	-0.500	0.052	0.053	-0.300	0.062	0.062	0.200
	Unmatched	0.108	0.046	23.400	0.110	0.046	23.700	0.100	0.045	21.400	0.091	0.049	16.400	0.088	0.042	18.600
Firm size	Matched	0.090	0.089	0.300	0.067	0.068	-0.700	0.075	0.075	0.000	0.069	0.069	-0.200	0.066	0.065	0.300
	Unmatched	4.803	4.684	11.200	4.644	4.476	16.000	4.707	4.552	15.100	4.662	4.525	13.400	4.639	4.481	15.600
ln age	Matched	4.768	4.773	-0.500	4.550	4.571	-2.000	4.642	4.648	-0.500	4.592	4.603	-1.100	4.571	4.578	-0.700
	Unmatched	1.995	2.080	-12.000	1.816	1.892	-9.700	1.905	1.993	-12.000	1.922	2.029	-14.900	1.953	2.050	-13.900
No political links	Matched	1.999	1.990	1.300	1.816	1.812	0.600	1.912	1.909	0.300	1.946	1.940	0.900	1.974	1.970	0.600
	Unmatched	0.509	0.494	3.200	0.781	0.742	9.200	0.748	0.727	4.600	0.775	0.762	3.200	0.785	0.787	-0.600
Non-exporter	Matched	0.510	0.507	0.600	0.777	0.777	-0.200	0.747	0.743	0.900	0.777	0.774	0.700	0.789	0.787	0.500
	Unmatched	0.693	0.771	-17.800	0.674	0.778	-23.400	0.685	0.776	-20.500	0.710	0.786	-17.400	0.743	0.812	-16.800
R&D	Matched	0.712	0.725	-2.900	0.729	0.722	1.500	0.717	0.716	0.200	0.746	0.743	0.700	0.771	0.773	-0.600
	Unmatched	0.115	0.111	1.500	0.114	0.092	7.400	0.089	0.075	5.200	0.094	0.074	7.300	0.101	0.079	7.800
ln agglomeration	Matched	0.116	0.118	-0.700	0.107	0.109	-0.600	0.086	0.086	0.200	0.086	0.087	-0.500	0.094	0.094	-0.200
	Unmatched	1.813	1.826	-1.200	1.895	1.932	-3.400	1.858	1.929	-6.400	1.837	1.967	-11.700	1.838	2.003	-15.200
ln herfindahl	Matched	1.817	1.781	3.200	1.911	1.906	0.400	1.880	1.855	2.200	1.899	1.876	2.100	1.902	1.868	3.100
	Unmatched	-6.336	-6.312	-2.300	-6.527	-6.516	-1.000	-6.495	-6.495	0.000	-6.553	-6.551	-0.200	-6.676	-6.684	0.800
ln diversification	Matched	-6.350	-6.333	-1.600	-6.551	-6.552	0.200	-6.518	-6.516	-0.200	-6.577	-6.573	-0.400	-6.698	-6.703	0.500
	Unmatched	-0.699	-0.708	2.500	-0.631	-0.631	0.200	-0.654	-0.653	-0.200	-0.645	0.641	-1.000	-0.639	-0.627	-3.600
ln fixed costs	Matched	-0.699	-0.706	2.000	-0.631	-0.631	0.300	-0.652	-0.657	1.700	-0.639	-0.643	1.400	-0.632	-0.639	2.500
	Unmatched	1.107	1.065	4.700	1.006	0.970	4.000	1.024	1.007	2.000	1.002	0.985	2.000	0.984	0.974	1.200
ln TFP	Matched	1.103	1.120	-1.900	0.987	0.994	-0.700	1.015	1.023	-0.900	0.988	1.001	-1.500	0.976	0.986	-1.200
	Unmatched	-2.220	-2.521	18.500	-2.055	-2.309	16.700	-2.196	-2.407	14.200	-2.318	-2.319	13.300	-2.069	-2.207	10.200
Rubin's B	Matched	-2.221	-2.238	1.000	-2.082	-2.109	1.700	-2.213	-2.252	2.700	-2.163	-2.191	1.900	-2.099	-2.134	2.600
	Unmatched	44.7*			46.0*			43.4*			42.5*			43.5*		
Rubin's R	Matched	4.900			3.600			3.900			3.700			4.200		
	Unmatched	1.440			1.450			1.490			1.360			1.400		
	Matched	0.860			1.080			0.970			1.000			0.960		

Table U.3 Balancing test results for firms with strong political links and firms with both type assistance[ab]

		Matched on Strong political links(1:1)			Matched on both type assistance（1:5）		
Variable		Treated	Control	%bias	Treated	Control	%bias
Receiving assistance	Unmatched	0.529	0.621	-18.700	1.000	0.610	113.100
	Matched	0.529	0.518	2.200	1.000	0.559	127.700
State owned	Unmatched	0.434	0.059	96.600	0.389	0.067	83.300
	Matched	0.434	0.416	4.700	0.389	0.383	1.700
Foreign owned	Unmatched	0.077	0.073	1.800	0.099	0.072	9.700
	Matched	0.077	0.087	-3.800	0.099	0.112	-4.400
HK/Macau/Taiwan owned	Unmatched	0.030	0.083	-22.900	0.037	0.082	-18.900
	Matched	0.030	0.029	0.800	0.037	0.036	0.600
Firm size	Unmatched	5.056	4.685	29.000	5.270	4.687	46.400
	Matched	5.056	5.032	1.800	5.270	5.238	2.600
ln age	Unmatched	2.210	1.972	34.100	2.169	1.977	27.500
	Matched	2.210	2.217	-1.000	2.169	2.174	-0.700
Private owned	Unmatched	0.390	0.664	-57.000	0.415	0.659	-50.300
	Matched	0.390	0.399	-1.900	0.415	0.413	0.400
Non-exporter	Unmatched	0.789	0.730	14.000	0.729	0.732	-0.700
	Matched	0.789	0.788	0.200	0.729	0.730	-0.400
R&D	Unmatched	0.233	0.093	38.400	0.290	0.095	51.200
	Matched	0.233	0.238	-1.400	0.290	0.291	-0.100
ln agglomeration	Unmatched	1.097	1.885	-67.600	1.086	1.872	-65.300
	Matched	1.097	1.050	4.000	1.086	1.070	1.300
ln herfindahl	Unmatched	-5.959	-6.476	45.000	-5.985	-6.466	41.500
	Matched	-5.959	-5.916	-3.800	-5.985	-5.967	-1.600
ln diversification	Unmatched	-0.650	-0.627	-5.600	-0.666	-0.627	-9.100
	Matched	-0.650	-0.655	1.300	-0.666	-0.667	0.200
ln fixed costs	Unmatched	1.215	1.053	15.300	1.215	1.055	16.900
	Matched	1.215	1.234	-3.300	1.215	1.237	-2.400
ln TFP	Unmatched	-2.874	-2.321	-33.300	-2.787	-2.332	-27.600
	Matched	-2.874	-2.915	2.400	-2.787	-2.814	1.600
Rubin's B	Unmatched	139.0*			141.4*		
	Matched	9.500			31.1*		
Rubin's R	Unmatched	1.950			2.30*		
	Matched	0.940			0.970		

[a]According to Rosenbaum and Rubin(1985), if the abs of reduced bias of covariates are lower than 20%, the "treated" and "control" groups are balanced.
[b] Rubin (2001) recommends that B be less than 25 and that R be between 0.5 and 2 for the samples to be considered sufficiently balanced.

Table U.4: Parameter estimates of estimated by Cox proportional Hazard Model on "matched" data

VARIABLES	(1) matched on assistance (1:1)	(2) matched on strong political links (1:1)	(3) matched on both (1:5)
Assistance rate<10.4%	-0.168***	-0.091	-0.211***
Assistance rate10.4%–<15.2%	-0.111***	-0.146**	-0.031
Assistance rate 15.2%–<18.7%	-0.042**	0.051	-0.027
Assistance rate 18.7%+	-0.163***	-0.134*	-0.134**
Assistance rate<10.4% × Period 2003-2007	0.044**	-0.052	-0.003
Assistance rate 10.4%–<15.2% × Period 2003-2007	0.111***	0.104	0.032
Assistance rate 15.2%–<18.7% × Period 2003-2007	0.175***	0.211***	0.187***
Assistance rate 18.7%+× Period 2003-2007	0.137***	0.112	0.126**
Strong political links	-0.225***	-0.101	-0.223**
Strong political links × Period 2003-2007	0.163	0.057	0.116
Strong political links × Assistance rate<10.4%	-0.250***	-0.278***	-0.149**
Strong political links × Assistance rate 10.4%-<15.2%	-0.050	-0.042	-0.046
Strong political links × Assistance rate 15.2%-<18.7%	-0.098*	-0.276***	-0.123*
Strong political links × Assistance rate 18.7%	-0.142***	-0.158**	-0.111*
Period 2003-2007	0.412***	0.135	0.185***
State owned	-0.239***	-0.459***	-0.379***
State owned × Period 2003-2007	0.498***	0.654***	0.590***
Strong political links × State owned	0.209**	0.214**	0.237**
Strong political links × State owned × Period 2003-2007	-0.208*	-0.231*	-0.203
Private owned	-0.093***	-0.310***	-0.166***
Private owned × Period 2003-2007	-0.120***	0.064	-0.032
Strong political links × Private owned	0.338***	0.355***	0.245**
Strong political links × Private owned × Period 2003-2007	-0.125	-0.149	-0.118
Foreign owned	-0.442***	-0.770***	-0.725***
HK/Macau/Taiwan owned	-0.269***	-0.375***	-0.387***
Firm size	-0.340***	-0.278***	-0.257***
ln age	-3.743***	-3.936***	-4.004***
No political links	-0.281***	-0.243***	-0.301***
Non-exporter	0.183***	0.171***	0.232***
R&D	-0.600***	-0.792***	-0.713***
ln agglomeration	-0.004	0.026***	0.017*
ln Herfindahl	0.054***	-0.018	0.045
ln Diversification	-0.286***	-0.178***	-0.277***
ln Fixed costs	0.006*	0.008	0.008
City200	0.136***	0.059**	0.134***
%open	-0.081***	-0.081***	-0.080***
Tariff rate	0.020***	-0.017***	-0.010**
East Coast	-0.103***	-0.261***	-0.239***
North East	-0.205***	-0.142***	-0.055
Western	-0.294***	-0.220***	-0.295***
ln TFP	-0.206***	-0.118***	-0.057***
Industry dummies	yes	yes	yes
Log likelihood	-1094567	-82809.475	-100244.75
Observations	954,465	91,816	128,266

Note *** p<0.01, ** p<0.05, * p<0.1

Basic processing of data

There are approximately 2.18 million observations in our dataset. We think it is important not to, a priori, drop what may seem to be outliers without direct evidence, except when the following conditions hold:

a) We keep firms that establishing since the year 1978, because that's when China started the transition from a planned to market economy.
b) When estimating TFP using system GMM (Harris and Li,2016)[23], SIC12 (Timber logging industry) was dropped due to too few observations, SIC13 (Agricultural and side industry), SIC5 (Beverages industry), SIC39 (Electrical machinery and equipment industry) and SIC40(Communications equipment industry) do not pass the Hansen test in the GMM estimation and are therefore omitted. Moreover, for SIC10,14,17,23,26,31,44,34,45 and 46 we use the BACON procedure in STATA to deal with outliers, with approximately 15% of observations being dropped from the empirical estimation of firm survival.
c) For SIC34 and SIC43 there were no data on the open rate per industry/province, so these were omitted as well.

Thus, after applying (a) – (c), we retain 1,322,907 observations for estimation.

(2) Matching process

In order to control the potential endogeneity of assistance, we separately matched on financial assistance, strong political links and both; accordingly, there are 736,737, 49,862 and 26,362 observations for each group (see Table U.5). We chose nearest neighbour matching 1:1 with replacement for the first two groups and 1:5 with replacement[24] for firms receiving both type of assistance.

Table U.5 Process for Propensity Score Matching

	Treated (On support)	Untreated (On support)	Matched obs.	Remain for estimation
Assistance	736,737	563,242	976,366	954,465
Strong political links	49,862	1,302,944	92,872	91,816
Both	26,362	1,326,444	129,828	128,266

[23] TFP was taken from Harris and Li (2016), which uses the same methodology as that used in Ding et. al. (2016).
[24] We use replacement option because except for the year of 1998 and 1999, the number of "treated" group, which receiving financial assistance is much more than "control" group. Therefore, we use the replacement option for all matching to be consistent.